



Labor Market Analysis for Program Recommendation Artificial Intelligence Occupations Laney College

Prepared by the San Francisco Bay Center of Excellence for Labor Market Research

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Recommendation

Based on all available data, there appears to be an “undersupply” of Artificial Intelligence workers compared to the demand for this cluster of occupations in the Bay region and in the East Bay sub-region (Alameda, Contra Costa counties). There is a projected annual gap of about 20,197 students in the Bay region and 2,250 students in the East Bay Sub-Region.

Introduction

This report provides student outcomes data on employment and earnings for TOP 0799.00 Other Information Technology programs in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at Laney College and in the region.

This report profiles Artificial Intelligence Occupations in the 12 county Bay region and in the East Bay sub-region for a proposed new program at Laney College.

- **Computer and Information Systems Managers (11-3021):** Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming. Excludes “Computer Occupations” (15-1111 through 15-1199).
Entry-Level Educational Requirement: Bachelor’s degree
Training Requirement: None
Percentage of Community College Award Holders or Some Postsecondary Coursework: 21%
- **Software Developers (15-1252):** Research, design, and develop computer and network software or specialized utility programs. Analyze user needs and develop software solutions, applying principles and techniques of computer science, engineering, and mathematical analysis. Update software or enhance existing software capabilities. May work with computer hardware engineers to integrate hardware and software systems, and develop specifications and performance requirements. May maintain databases within an application area, working individually or coordinating database development as part of a team.
Entry-Level Educational Requirement: Bachelor’s degree
Training Requirement: None
Percentage of Community College Award Holders or Some Postsecondary Coursework: 11%
- **Data Scientists (15-2051):** Develop and implement a set of techniques or analytics applications to transform raw data into meaningful information using data-oriented programming languages and visualization software. Apply data mining, data modeling, natural language processing, and machine learning to extract and analyze information from large structured and unstructured datasets. Visualize, interpret, and report data findings.

May create dynamic data reports.

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of Community College Award Holders or Some Postsecondary Coursework: 11%

Occupational Demand

Table 1. Employment Outlook for Artificial Intelligence Occupations in Bay Region

Occupation	2021 Jobs	2026 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Computer and Information Systems Managers	47,580	50,330	2,750	6%	20,825	4,165	\$79	\$101
Software Developers	136,241	158,805	22,564	17%	75,436	15,087	\$62	\$79
Data Scientists	8,882	10,341	1,459	16%	4,804	961	\$60	\$77
Total	192,703	219,476	26,773	14%	101,064	20,213		

Source: Lightcast 2022.3

Bay Region includes: Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

Table 2. Employment Outlook for Artificial Intelligence Occupations in East Bay Sub-region

Occupation	2021 Jobs	2026 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Computer and Information Systems Managers	8,045	7,902	-143	-2%	2,918	584	\$70	\$88
Software Developers	17,365	18,526	1,160	7%	7,602	1,520	\$55	\$70
Data Scientists	1,648	1,780	132	8%	729	146	\$53	\$68
Total	27,059	28,208	1,149	4%	11,250	2,250		

Source: Lightcast 2022.3

East Bay Sub-Region includes: Alameda, Contra Costa Counties

Job Postings in Bay Region and East Bay Sub-Region

Table 3. Number of Job Postings by Occupation for latest 12 months (Feb. 2022 - Jan. 2023)

Occupation	Bay Region	East Bay
Software Developers	98,936	14,842
Data Scientists	18,738	2,754
Computer and Information Systems Managers	2,723	463

Source: Lightcast

Table 4a. Top Job Titles for Artificial Intelligence Occupations for latest 12 months (Feb. 2022 - Jan. 2023)
Bay Region

Title	Bay	Title	Bay
Software Engineers	10,327	Full Stack Developers	1,497
DevOps Engineers	3,316	Software Developers	1,427

Title	Bay	Title	Bay
Data Scientists	3,102	Machine Learning Engineers	1,249
Full Stack Software Engineers	2,540	Full Stack Engineers	1,236
Java Developers	2,292	Android Developers	1,220
Data Analysts	2,290	Platform Software Engineers	1,203
Principal Software Engineers	1,657	Salesforce Developers	1,189
Staff Software Engineers	1,541	Software Development Engineers	1,104
Back End Software Engineers	1,516	Lead Software Engineers	1,081

Source: Lightcast

Table 4b. Top Job Titles for Artificial Intelligence Occupations for latest 12 months (Feb. 2022 - Jan. 2023) East Bay Sub-Region

Title	East Bay	Title	East Bay
Software Engineers	1,617	Lead Software Engineers	202
DevOps Engineers	534	Principal Software Engineers	189
Java Developers	515	Embedded Software Engineers	186
Data Analysts	392	Security Software Engineers	179
Full Stack Software Engineers	379	Android Developers	171
Data Scientists	343	Salesforce Developers	154
Software Developers	339	Software Development Engineers	148
Full Stack Developers	294	Full Stack Java Developers	145
.NET Developers	220	Application Engineers	143

Source: Lightcast

Industry Concentration

Table 5. Industries hiring Artificial Intelligence Workers in Bay Region

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2021)	Jobs in Industry (2026)	% Change (2021-26)	% Occupation Group in Industry (2022)
Custom Computer Programming Services	37,729	45,020	19%	20%
Internet Publishing and Broadcasting and Web Search Portals	26,184	32,281	23%	13%
Software Publishers	24,001	28,026	17%	12%
Computer Systems Design Services	20,260	22,147	9%	10%

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2021)	Jobs in Industry (2026)	% Change (2021-26)	% Occupation Group in Industry (2022)
Electronic Computer Manufacturing	10,959	12,767	16%	6%
Data Processing, Hosting, and Related Services	8,673	12,162	40%	5%
Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	5,278	6,510	23%	3%
Corporate, Subsidiary, and Regional Managing Offices	5,580	5,464	-2%	3%
Other Computer Related Services	4,640	5,410	17%	2%
Research and Development in Biotechnology (except Nanobiotechnology)	3,071	4,189	36%	2%

Source: Lightcast 2022.3

Table 6. Top Employers Posting Artificial Intelligence Occupations in Bay Region and East Bay Sub-Region (Feb. 2022 - Jan. 2023)

Employer	Bay	Employer	East Bay
Jobot	2,581	Lucid Motors	750
Uber	1,823	Revature	576
Randstad	1,428	Workday	482
Apple	1,413	Robert Half	290
Motion Recruitment	1,304	Wells Fargo	267
Revature	1,301	Albertsons	205
Amazon	1,263	Jobot	200
Google	1,203	Kforce	156
Cynet Systems	1,116	Randstad	142
Lucid Motors	1,074	Siemens	135

Source: Lightcast

Educational Supply

There is one (1) community college in the Bay Region issuing 16 awards on average annually (last 3 years ending 2018-19) on TOP 0799.00 Other Information Technology. In the East Bay Sub-Region, there are no community colleges that issued awards on average annually (last 3 years) on this TOP code.

Table 7. Community College Awards on TOP 0799.00 - Other Information Technology in Bay Region

College	Subregion	Low unit Certificate	Total
Santa Rosa	North Bay	16	16
Total		16	16

College	Subregion	Low unit Certificate	Total
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Source: Data Mart

Note: The annual average for awards is 2017-18 to 2019-20.

Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 20,213 annual openings for the Artificial Intelligence occupational cluster and 16 annual (3-year average) awards for an annual undersupply of 20,197 students. In the East Bay Sub-Region, there is also a gap with 2,250 annual openings and no annual (3-year average) awards for an annual undersupply of 2,250 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0799.00 - Other Information Technology

Metric Outcomes	Bay All CTE Programs	Laney All CTE Program	State 0799.00	Bay 0799.00	East Bay 0799.00	Laney 0799.00
Students with a Job Closely Related to Their Field of Study	74%	73%	71%	78%	N/A	N/A
Median Annual Earnings for SWP Exiting Students	\$48,926	\$41,990	\$43,308	\$43,704	\$33,638	N/A
Median Change in Earnings for SWP Exiting Students	23%	15%	13%	18%	18%	N/A
Exiting Students Who Attained the Living Wage	50%	48%	56%	46%	44%	N/A

Source: Launchboard Strong Workforce Program Median of 2018 to 2021.

Skills, Certifications and Education

Table 9. Top Skills for Artificial Intelligence Occupations in Bay Region (Feb. 2022 - Jan. 2023)

Skill	Posting	Skill	Posting
Computer Science	46,901	Application Programming Interface (API)	21,883
Software Engineering	43,349	C++ (Programming Language)	19,177
Python	41,166	Automation	18,119
Java	39,012	Debugging	17,891
Software Development	29,768	Machine Learning	15,420
SQL	29,040	Docker (Software)	15,296
Amazon Web Services	23,153	Algorithms	15,254
JavaScript	23,089	Linux	14,806
Agile Methodology	22,999	Git (Version Control System)	14,482

Skill	Posting	Skill	Posting
Scalability	22,827	Kubernetes	13,786

Source: Lightcast

Table 10. Certifications for Artificial Intelligence Occupations in Bay Region (Feb. 2022 - Jan. 2023)

Certification	Posting	Certification	Posting
Software Development Engineer in Test	1,229	Secret Clearance	235
Master Of Business Administration (MBA)	1,159	Functional Skills Qualification	221
Security Clearance	1,141	Salesforce Certified Platform Developer I	205
Certified Power Quality Professional	822	Salesforce Certified Platform Developer II	198
Enterprise Desktop Administrator (Microsoft Certified IT Professional)	675	Microsoft Certified Professional	164
Salesforce Certification	594	Cisco Certified Network Associate	160
Top Secret-Sensitive Compartmented Information (TS/SCI Clearance)	317	American Medical Billing Association	143
Salesforce Certified Administrator	299	ITIL Certifications	140
Certified Information Systems Security Professional	278	GIAC Certifications	137
Project Management Professional Certification	275	CompTIA Security+	132

Source: Lightcast

Table 11. Education Requirements for Artificial Intelligence Occupations in Bay Region

Education Level	Job Postings	% of Total
High school or GED	814	1%
Associate degree	2,227	2%
Bachelor's degree & higher	103,713	97%

Source: Lightcast

Note: 42% of records have been excluded because they do not include a degree level. As a result, the chart above may not be representative of the full sample.

Methodology

Occupations for this report were identified by use of job descriptions and skills listed in O*Net. Labor demand data is sourced from Lightcast occupation and job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CCCCO Data Mart and CTE Launchboard.

Sources

O*Net Online

Lightcast

CTE LaunchBoard www.calpassplus.org

Launchboard

Statewide CTE Outcomes Survey

Employment Development Department Unemployment Insurance Dataset

Living Insight Center for Community Economic Development

Chancellor's Office MIS system

Contacts

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